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ABSTRACT

The author demonstrates mathematically that shifting from a grant to loan financing system for students lengthens the time before a graduate breaks even. The implication is that all loan financing for which the repayment is concentrated in the earlier years of working life has some deterrent effect upon college attendance because the net payoff is concentrated in the later part of working life. Since short amortization periods impose heavy burdens of cash outflows on the student and since expectations are not always correct, the author urges that loan financing of higher education be tempered by spreading risks and basing repayment on contingent income or providing for some kind of forgiveness arrangement to compensate insofar as possible for the following considerations: (1) pessimistic future income forecasts; (2) probabilistic events such as illness and disability; (3) the choice of socially valuable but low-income occupations at the time of the occupational decision after college is completed (and this might include the choice of child-bearing and child-rearing for women); and (4) the presence of high discount rates among some students. (Author)

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THE REPAYMENT PERIOD FOR LOAN-FINANCED COLLEGE EDUCATION

F. E. Balderston

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PREFACE

This is one of a continuing series of reports of the Ford Foundation sponsored Research Program in University Administration at the University of California, Berkeley. The guiding purpose of this Program is to undertake quantitative research which will assist university administrators and other individuals seriously concerned with the management of university systems both to understand the basic functions of their complex systems and to utilize effectively the tools of modern management in the allocation of educational resources.

This paper is a revision and expansion of a technical note contributed to a conference on student loan financing sponsored by the Brookings Institution and held in Washington, D. C. in April, 1970.

THE REPAYMENT PERIOD FOR LOAN-FINANCED COLLEGE EDUCATION

Loans to the student are one among several sources of financing of the expenses of college attendance. Other sources are the student's own assets and income from part-time work during the college year and from possible full-time work while not attending college; the income and assets of the student's parents; grants and scholarships from institutional resources, local or state government resources, or federal programs; and grants or other assistance from foundations or other non-governmental agencies other than the colleges and universities themselves. Interest in loan financing as an increasingly large component of assistance to students has been exhibited by President Nixon in his higher education message of March 19, 1970. Dr. Robert W. Hartman of the Brookings Institution has produced a detailed analysis, Public Policy for Higher Education, Student Loans (Washington, D.C., The Brookings Institution, April, 1970).

Heavy reliance on loan financing has the effect of shifting the eventual burden of payment for the cost of higher education toward the student and his future income. I agree with those who claim that there are major social returns to higher education in addition to private returns, and that, therefore, there is a case for substantial public financing of higher education, both as to the institutional cost of college and university capital facilities and operation and as to the financing of the attendance cost to the student. Also, I believe that in connection with the problem of assuring access to higher education, there is an excellent case for substantial grant financing of students from low and low-middle income families. Furthermore, I believe that there are significant unresolved policy problems relating to

timing of the student's emancipation from his parents, and significant policy problems relating to the financing of the education of women who in our society generally expect to spend a significant part of their adult lives in the household caring for children. Also, there is a major national and regional policy problem of finding the resources to build and operate sufficient enrollment-taking capacity, and this problem is not resolved by looking only at the financing of the student. In fact, to the extent that tuition and fees are increased as a result of more generous grant or loan financing of students, this will provide institutions with greater latitude to raise their fees and will shift a part of their expansion costs from public sources to the student.

Finally, I agree with those who take the basic economic view that real resources are absorbed in higher education in the current period. To the extent that loan financing of students is used both to take care of some institutional costs and to take care of the room, board, and other costs of the student in attending, this represents a financing shift to the student over his working life or part of it, but the real resources must still be brought away from other alternative activities in each current period.

Now we consider the question of the loan repayment period, where the presumption is that loan financing is the major if not the only basis upon which the student's costs of attendance are financed. Let us consider the investment in human capital as an *ex ante* problem of private returns to the person facing the college-going decision at the time of high-school graduation, and of future ability to pay interest and principal on a substantial debt that is incurred before the individual begins a work career. If loan financing is heavily or exclusively used, this is the form which the problem takes to the young person facing the college-going decision. In this

circumstance, what is the time stream of market payoff from a completed college education?

In Figure I, we show on the vertical axis the cumulative income (undiscounted and in constant dollars) which the student would have under two alternatives: going to college and not going to college. It is presumed that by the end of his working life, the college-going student of given ability will have earned greater lifetime cumulative income than he would have had he not gone to college. The point of the diagram in Figure I, however, is that on an undiscounted basis, the college-going student will have foregone several years of income, and he will not catch up in cumulative income until a break-even year, B_I . In Figure II, we show discounted cumulative income, again in constant dollars, for the case where the student attends college and for the case in which the same student did not attend college. As a consequence of discounting, the break-even year, B_{II} , is shifted to the right. With a sufficiently high discount rate, in fact, the two curves may never cross, and the private decision of the student may be that it is not worthwhile to attend college from the point of view of discounted market payoff.

The two cumulative income curves are drawn in Figure I on the (generally correct) assumption that annual income increases throughout working life. Thus, the cumulative income curves are concave from above. In Figure II, discounted cumulative income, up to the end to the end of each year, is shown as concave from below. Discounting may produce this effect, or may even cause the curves to fall over some portion of the time horizon. Only if the compound annual growth rate of yearly income is higher than the discount rate will the curves of Figure II be concave from above.

A word is perhaps in order concerning the construction of Figure II.

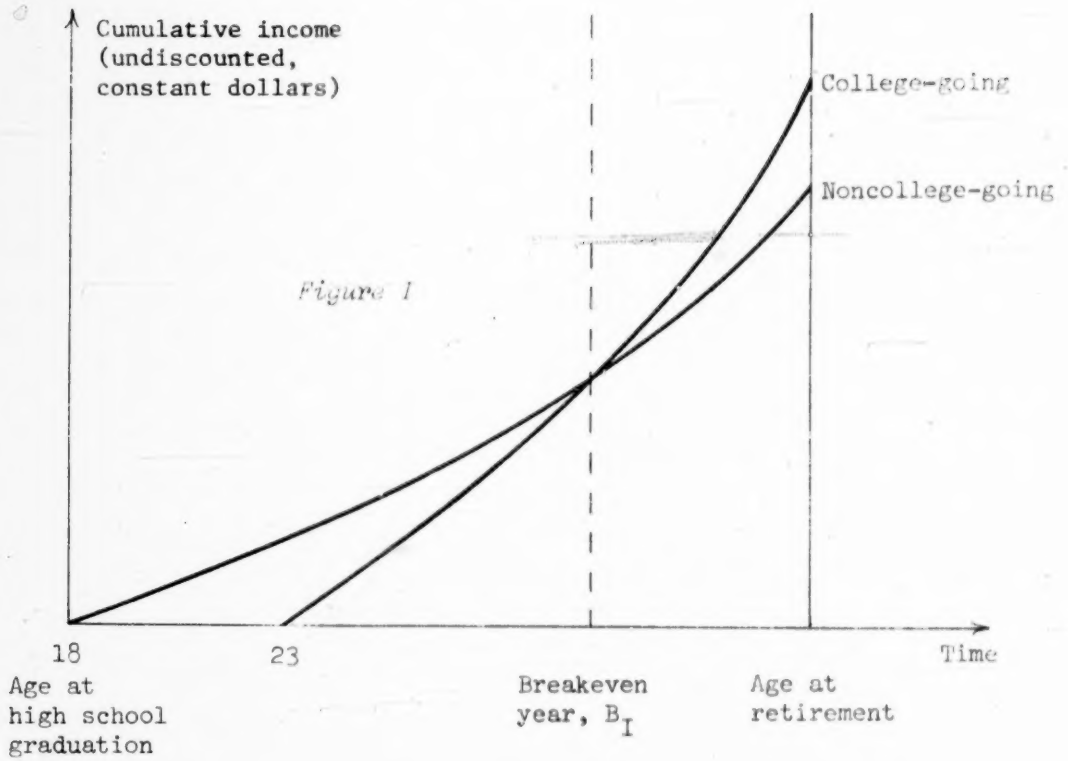

Figure I

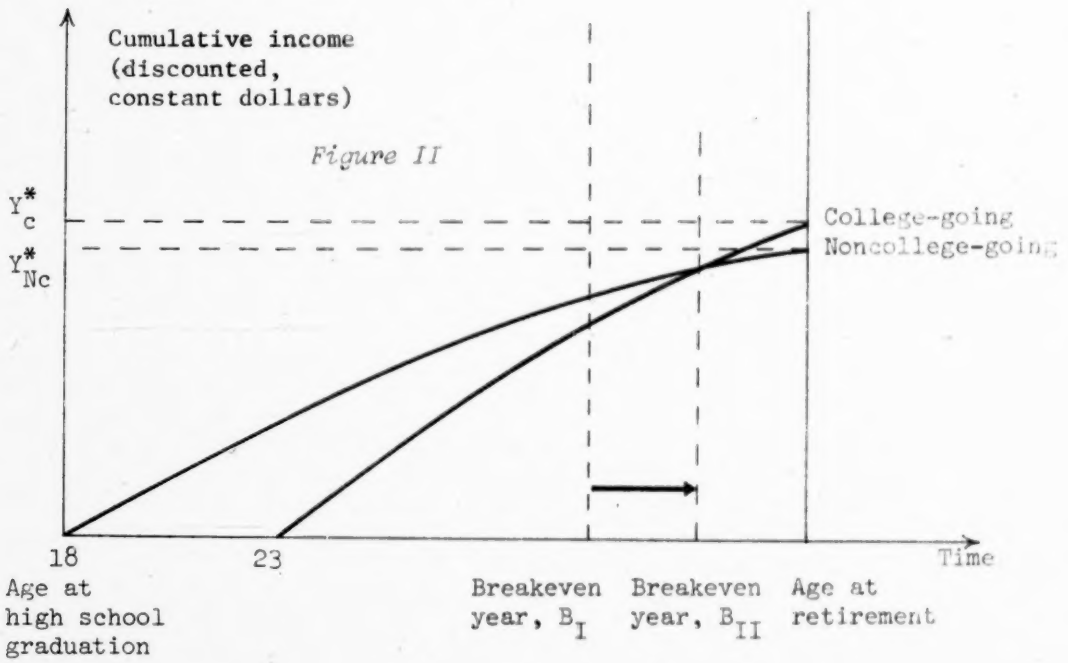

Figure II

Each point on the cumulative income curve represents the cumulative income to the end of that year, discounted back to the time of high school graduation according to a discount rate chosen by the student. Thus, for any time-horizon into the future the discounted cumulative incomes for the two income streams -- college-going and non-college-going -- can be compared. In Figure II, as drawn, the discounted earnings stream over the entire working life-time produces a discounted cumulative income, Y^*_c, which is greater than that of not going to college, Y^*_{nc}.

Comparison of the two diagrams shows that the net payoff of college attendance and completion is concentrated in the later part of the working life of the student if he attends college. This is true even for undiscounted cumulative income, and it becomes still more true if the student, as he rationally should, engages in discounting of the two alternative income streams.

The student's discount rate applies to both future income streams, viewed at the time of high school graduation, and is a means of collapsing time preference for earlier as against later income into a comparative framework. If, in addition, the future income each year can be estimated only with known range of error, the expected value of each year's income would be corrected downward by a risk-averse student. This could be done by increasing the discount rate to reflect risk aversion. Other and more complicated approaches to the treatment of uncertain future income are necessary.

The higher the student's discount rate, the farther to the right B_{II} is relative to capital B_I as is seen by comparing Figure I and Figure II. We can therefore conclude that all loan financing for which the repayment is concentrated in the early years of working life -- say, the first ten

years after graduation -- has some deterrent effect upon college attendance. To the extent that loan financing is a nominal and minor component of the total financing arrangements of the student, the deterrent effect is small. Correspondingly, if loan financing is heavily relied on, the deterrent effect of loans with a short repayment period cannot fail to be substantial.

The shorter the repayment period of a loan-financed education, the greater is the rational discouragement to the student to obtain a college education. The first problem he faces is the risk of a net loss in the event that he fails to complete college work but still has debt hanging over him to be paid off out of a cumulative income stream that is lower than it would have been had he completed college work. Furthermore, the student who does not have an optimistic forecast of future income or who has a high subjective discount rate is relatively more discouraged by an opportunity to finance his education only with loans having a short repayment period than is the student who has an optimistic future income forecast or a low subjective discount rate.

The college-going young person who does not complete a degree will very probably be a net loser on the educational investment, privately considered. There is only fragmentary evidence about this, the question being to what extent an exposure to education beyond high school in academic curricula assists in the winning of a cumulative income pattern closer to that of the college-completing student than that of the student who goes directly into the work force from school. But it is a reasonable presumption that the baccalaureate degree is a significant basis of certification for many types of jobs in the contemporary labor market, and that this certification effect will probably increase rather than decrease in the future.

We may now ask, who among candidates for college attendance in the general population are likely to be the students who have pessimistic future income forecasts or high subjective discount rates? In both cases, the answer seems to be: not the son of upper-middle-class parents, but the son of parents who themselves have a relatively low level of education and income.

Students from low income, low education families who now attend college are induced to do so by their own motivations, by the availability of grants and work-study and to some extent loan financing, and by the availability of income earning opportunity during the summer or other periods of interruption of college. Many of them have, or quickly accumulate after beginning college attendance, a strong desire to participate in the life style of middle-class college-going students, at least to the extent of wanting a pattern of life which will involve more or less equivalent cost if not the same content of expenditures. And there are good educational reasons why this is often desirable -- e.g., participation in dormitory life and in student activities rather than in the grind of very heavy involvement in income-earning part-time work.

These are reasons why the cost pattern of attendance is not necessarily low for the student of low income background. They are also reasons why such a student will tend to have a high subjective discount rate.

As to the question of optimism or pessimism concerning life-time income forecasts, there is some evidence that the student of low socioeconomic background has a lower probability of completing college education than does the student of middle-class background. There is also evidence, perhaps fragmentary, that the student of low socioeconomic background has a lower life-time earnings profile to look forward to than does the

high socioeconomic status student. These are reasons why aversion to debt on the part of the student from low income background is by no means "irrational."

If loan financing is the main basis of support to students during the college going years, the above argument has implications for the design of an ideal loan financing approach for the college going investment. This design would make the repayment period equal to the interval of net payoff. That is, the repayment term would be coincident with the working life-time or with that part of the working life-time prior to the effective obsolescence of the training received. Further, because of differences in motivations and expectations, the loan financing approach to student support would imply spreading risks and basing repayment on contingent income or providing for some kind of forgiveness arrangement to compensate insofar as possible for the following considerations: (a) pessimistic future income forecasts; (b) probabilistic events, such as illness and disability; (c) the choice of socially valuable but low-income occupations at the time of the occupational decision after college is completed (and this might include the choice of child-bearing and child-reading for women); and (d) the presence of high discount rates among some students.

We know that students from upper middle and high income families are in a position either to avail themselves of their parents' distribution of assets, which is heavily skewed in the household sector to upper income families, or to avail themselves of the access which their parents have to commercial banks, insurance companies, and other sources of borrowing.

It is the low income student who has neither private assets from the

household sector nor contacts and knowledge from his parents of the possibilities for use of intermediary financing institutions. Thus, a loan financing program should be as accessible as possible to students of all income and knowledge backgrounds, with the opportunity to initiate borrowings through sympathetic and clearly available channels, such as the financial aid offices of the colleges and universities themselves, rather than through dealings with banks, savings and loans associations, or other commercial instituions.

A short repayment period reduces the interval of time over which the account receivable must be maintained. This cuts the administrative cost of the collection process. Former students change addresses and locations and jobs, and the tracing problems become formidable. Many loan programs have therefore been designed to minimize these administrative costs. Yet the logic of the argument stated above compels very serious consideration of a life-time debt servicing period, and this becomes especially true if loan financing is the main source of financing for college attendance.

In fact, as we know from typical mortgage financing tables in the housing market, flat monthly payments on very long-term mortgage obligations include a very small provision for debt repayment in the first half or two-thirds of the life of a thirty-or-forty-year mortgage. Yet forty years is the approximate working life-time of the college-going student. The monthly payment on a 40-year, 6% loan of $10,000 is $55.02. At the end of the 20th year, the principal balance still outstanding is $7,680. If we do not bother with amortization at all, the interest cost alone is $600 per year or $50 per month.

By contrast, a 6% loan of $10,000 to repaid in ten years would have a monthly payment of $111.02, and one of twenty years would have a monthly

payment of $71.64. These comparisons reinforce the point that a short amortization period of, say, ten years, imposes a heavy burden of cash outflow on the former student -- approximately double that of a 40-year loan -- and concentrates it during the early income-earning years, which are years of relatively low income and income typically devoted to the heavy expenses of establishing a family and buying a house and consumer durables. There is ample evidence that the age group between ages 45 and 64 is the one during which liquid asset accumulation occurs. Prior to this are the years of heavy family responsibility and lower income, and after this are the years of retirement. These are also the years during which the net return from a college education becomes positive, as Figure II shows. If repayment of loan principal is required, it should begin only at the time when liquid asset accumulation by the household would otherwise be taking place.

It would make sense to abandon the notion of amortization altogether and require only the payment of interest on the accumulated debt of a loan-financed college education, with provisions for forgiveness or for postponement of interest servicing in years of low income, disability, or other dislocation of the life pattern of the former student. Whether to have amortization at all, it seems to me, is chiefly a question whether to maintain the convention that the student eventually pays back everything that he owed. It makes very little effective difference in the annual financing flow, from society's point of view, and it makes a 10% difference in monthly cost to the student at the 40-year length of term and 6% interest rate that I have used for illustration.

If the notion of amortization were to be abandoned, this would require acceptance of the proposition that society was providing the capital and that

on a contingent-income basis or otherwise, the former student was simply providing interest servicing as a compensation for the human capital investment in him that society had made.

To summarize: a scheme of loan financing for the college-going investment should at the very least include acceptance of the logic that very long repayment is necessary. Such a scheme should also provide for risk over future incomes in view of differing individual expectations at the time of the college-going decision. If these two criteria are not met, the inevitable consequence must be to discourage decisions in favor of college attendance, particularly among students from low income, low education family backgrounds.

A national program of loan financing of the major costs of college attendance with 40-year amortization (or interest servicing only, which is not very different) could operate most easily through the mechanism of personal income tax payment to the Federal government or that of Social Security payments. This would also reduce very considerably the administrative costs of a major loan financing scheme.

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